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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/765,251	01/18/2001	Melvin A. Park	140-039	8166

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EXAMINER	
JOHNSTON, PHILLIP A	
ART UNIT	**PAPER NUMBER**
2881	

DATE MAILED: 11/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/765,251	PARK, MELVIN A.	
	Examin r	Art Unit	
	Phillip A Johnston	2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 18 January 2001 is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Detailed Action

Drawings Objection

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, in

Figure 3, reference numerals 3, 5, and 15;

Figure 4, reference numerals 6 and 7;

Figures 5A and 5B, reference numeral 10; and

Figure 6, reference numeral 3;

must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claims Rejection – 35 U.S.C. 112

2. Claim 1 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim contains subject matter, which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

In Claim 1, the limitation " wherein the distance between said parallel planes is substantially greater than the distance between poles within said planes such that substantially no electric field is present within the area between said parallel planes", is not described in the specification. No specific dimensions are provided for the distance between poles.

Claims Rejection – 35 U.S.C. 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,011,259, to Whitehouse.

Whitehouse (259) clearly discloses that the multipole ion guide as configured in the invention is positioned between the API source and the TOF flight tube. In a preferred embodiment of the invention, a linear multipole ion guide is incorporated into a Time-Of-Flight mass analyzer apparatus. The multipole ion guide is located in the vacuum pumping stage or stages between the ion source, specifically downstream of

the orifice into vacuum from an Atmospheric Pressure Ion (API) source, and the pulsing region of the TOF mass analyzer. The ion guide serves as an efficient means for transferring ions through one or more vacuum pumping stages between the API source free jet expansion and the TOF ion beam pulsing lenses. When transporting ions in a continuous beam, the multipole ion guide is usually operated in an RF only mode, which allows the stable transport of a wide range of m/z values through the ion guide while holding the electrostatic entrance and exit lens potentials at a constant value to optimize focusing of the primary beam into the TOF pulsing region. In the present invention the multipole ion guide is operated in both a non trapping mode and in an ion storage or trap mode with ions pulsed from the ion guide into the TOF analyzer pulsing region. This pulsed ion extraction from the exit of the multipole ion guide can be selected to occur with or without interruption of the ion accumulation process within the multipole ion guide. The multipole ion guide operated in the ion storage or trap mode can be configured for delivering ions to either a collinear or an orthogonal pulsing TOF geometry where the ions are subsequently pulsed into the TOF mass analyzer flight tube.

The invention includes the operation of the multipole ion guide to selectively trap, fragment and transmit ions to the pulsing region of a TOF mass analyzer to achieve MS/MS.sup.n functionality in a TOF mass analyzer apparatus interfaced to an API source. The electrical voltages applied to the rods of the multipole ion guide including AC and DC components are adjustable such that a selected range of ion m/z values have stable trajectories within the ion guide electrical field. Electrostatic lenses are

configured on the multipole ion guide entrance and exit ends such that voltages applied to these lenses allow either ion transmission through the multipole ion guide or trapping of ions within the ion guide. See Column 8, line 1-47.

Whitehouse (259) also clearly discloses in FIG. 4, the use of two multipole ion guides each of which begins and ends within one vacuum pumping stage. Multiple ion guide 110 is located entirely in the second vacuum pumping stage 112. A second multipole ion guide 111 is located entirely in the third vacuum pumping stage 113. Electrostatic lens 114 positioned between ion guides 110 and 111 serves as a vacuum stage partition between vacuum stages 112 and 113 and as an electrostatic ion optic element separating ion guides 110 and 111. Ions produced in an API source enter the first vacuum stage 117 through capillary exit 116. A portion of these ions continue through skimmer orifice 118 and enter multipole ion guide 110. Operating in single pass continuous beam mode, ions pass through ion guide 110, lens orifice 115, ion guide 111 and into TOF orthogonal pulsing region 120 where they are pulsed into TOF tube 123 and mass analyzed. Ion guide 110 operates in a background pressure typically maintained between $5x10^{-4}$ and $1x10^{-2}$ torr. Ion guide 111 operates in a background pressure maintained typically below $1x10^{-3}$ torr. Ion transfer between ion guides 110 and 11 and electrostatic lens 114 may not be as efficient as that achieved with a multiple vacuum stage multipole ion guide as shown in FIG. 1 but some similar MS/MS^n functional capability can be achieved with the embodiment diagrammed in FIG. 4. In the configuration shown in FIG. 4 ion guide 110 can be operated in trapping mode. Due to the higher pressure in ion guide 110 and using techniques such as

resonant frequency excitation, ion fragmentation can occur due to CID of ions with the neutral background gas within ion guide 110. Voltages can be applied independently to ion guides 110 and 111, so both ion guides can be operated in variety of trapping or transmission modes with different offset potentials or m/z selection. This operational flexibility allows some variation in functional step sequences in acquiring MS/MS^n data from those described for the embodiment illustrated in FIG. 1. Column 21, line 30-65.

It is implied herein that the multipole ion guide geometry of Whitehouse (259) above is equivalent to "having a plurality of poles arranged to form two parallel adjacent planes", as recited in Claim 1.

Whitehouse (259) also discloses that the geometry of the multipole ion guide in Fig. 1 includes a capillary exit 12 to skimmer orifice 13 distance set typically between 1 to 5 mm, a substantial neutral gas flux can pass through skimmer orifice 13 into second vacuum stage 18. Ions exiting skimmer orifice 13 enter the electric field of ion guide 16 still experiencing significant numbers of collisions with the neutral background gas. As the ions continue to drift through the length of ion guide 16, the neutral gas is pumped away and the number of collisions with the background gas diminishes. Multiple ion guide 16 with rods 20 extends continuously from vacuum stage 18 into vacuum stage 19. Multiple ion guide 16 is supported by electrical insulator 22 and partition 21 between vacuum stages 18 and 19. Multiple ion guide 16 can be a quadrupole, octapole or can have higher numbers of rods.

For the embodiment shown in FIG. 1, multipole ion guide 16 will be described as a quadrupole hexapole with radial dimensions small enough to minimize neutral gas

conductance from vacuum stage 18 to vacuum stage 19. The r_0 for such a quadrupole assembly can be as small as 1.25 mm. Multiple vacuum pumping stage hexapoles have been commercially available from Analytica of Branford, Inc. with an r_0 of approximately 1.25 mm. Hexapole ion guides which extend through more than one vacuum stage have been fabricated with rod diameters of 1 mm inside rod spacing of less than 2.5 mm. See Column 11, line 38-65.

Conclusion

5. Any inquiry concerning this communication or earlier communications should be directed to Phillip Johnston whose telephone number is (703) 305-7022. The examiner can normally be reached on Monday-Friday from 7:30 am to 4:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiners supervisor John Lee can be reached at (703) 308-4116. The fax phone numbers are (703) 872-9318 for regular response activity, and (703) 872-9319 for after-final responses. In addition the customer service fax number is (703) 872- 9317.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 0956.

PJ
November 4, 2003